

Appl. No. 10/650,504
Amdt. Dated September 27, 2006
Reply to Office Action of June 28, 2006

Attorney Docket No. 81872.0052
Customer No.: 26021

REMARKS/ARGUMENTS

Claims 1-12, 15-19 and 22-23 are canceled without prejudice. Claims 13 and 20 are amended. Claims 13, 14, 20 and 21 are pending in the application. Applicants believe that no new matter has been added. Reexamination and reconsideration of the application, as amended, are respectfully requested.

An object of the present invention is to provide a dry etching apparatus and a dry etching method that make it possible to form texture homogeneously on the surface of a substrate, and a plate and tray used therein. (Applicants specification at p.5 lines 4-7).

OBJECTIONS TO THE SPECIFICATION

The Specification is objected to as failing to provide proper antecedent basis for the claimed subject matter of Claim 20. Applicants respectfully disagree with this characterization, and submit that one of ordinary skill in the art would recognize that, especially in light of the Specification, a gap and space are synonymous terms. However, in the interest of furthering prosecution, Applicants have replaced the term "gap" with the term "space" in amended Claim 20.

Applicants respectfully submit that the Specification as filed gives support for "said protruding wall is separated from a nearest surface of said substrate by a space", as required by independent amended Claim 20. One such example can be found in Figure 12 and page 21, lines 14-17.

Withdrawal of this objection is, thus, respectfully requested.

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CLAIM REJECTIONS UNDER 35 U.S.C. §102

Claims 13-14 are rejected under 35 U.S.C. §102(b) as being anticipated by Cain et al. (U.S. Patent No. 5,503,881). Claims 20-21 are rejected under 35 U.S.C. §102(b) as being anticipated by Nishibayashi et al. (U.S. Patent No. 5,417,798). Applicants respectfully traverse the rejection. Amended independent Claim 13 is as follows:

A dry etching method for etching a surface of a substrate to be etched, said method comprising:
placing a substrate to be etched on an electrode inside a chamber, wherein a part of said chamber is connected to a ground; and
covering said substrate to be etched with a plate between said part of said chamber and said electrode, wherein said plate is provided with a number of opening portions,
wherein a distance between a surface opposing said substrate to be etched and said substrate to be etched in a peripheral portion of said plate is set shorter than a distance between said surface opposing said substrate to be etched and said substrate to be etched in a central portion of said plate.

Applicants respectfully submit that Cain fails to teach or suggest the subject matter that is claimed by Applicants amended independent Claim 13. For example, Cain fails to either teach or suggest "*placing a substrate to be etched on an electrode inside a chamber, wherein a part of said chamber is connected to a ground; and covering said substrate to be etched with a plate between said part of said chamber and said electrode, wherein said plate is provided with a number of opening portions*", as required by that claim.

As disclosed in the present Specification a plate 14 can be disposed between a pair of electrodes. One of these electrodes is electrode 9. The second of these

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electrodes can be a part of chamber 18, which can be connected to ground. The plate of the invention is disposed independently from both of the electrodes and functions to generate the residues on the substrate through etching to promote the acceleration of the formation of textures 2 on the substrate. (*See, Specification, pg. 13, lines 5-10; Fig. 2*)

Cain discloses that the distribution head 42 is connected to the RF generator 62 to make plasma. Therefore, the distribution plate 52 is at the RF potential with respect to the pedestal 58. The pedestal 58 comprises a cathode for the system, and the distribution plate 52 comprises an anode for the system (*See, Cain, col. 3, lines 30-32, Fig.*).

As Cain discloses a dispersion plate 52 that itself comprises an electrode (the anode), it cannot teach, disclose or suggest a plate that is placed between an electrode and a part of a chamber that is connected to ground.

Accordingly, Cain fails to teach or suggest "placing a substrate to be etched on an electrode inside a chamber, wherein a part of said chamber is connected to a ground; and covering said substrate to be etched with a plate between said part of said chamber and said electrode", as required by amended independent Claim 13.

Thus, Cain fails to teach, disclose, or suggest each and every step of amended independent Claim 13, and as such, amended independent Claim 13 is patentable over the cited reference for at least the reasons stated above.

Withdrawal of the above rejections and allowance of Claim 13 is respectfully requested.

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Amended independent Claim 20 is as follows:

A dry etching method etching a surface of a substrate to be etched, said method comprising:

placing a substrate to be etched on an electrode inside a chamber, wherein a part of said chamber is connected to a ground,

covering said substrate to be etched with a plate provided with a number of opening portions; and

forming fine textures on a surface of said substrate to be etched by applying RF power to said electrode,

wherein a protruding wall is provided to said plate on a surface opposing said substrate to be etched and said protruding wall is separated from a nearest surface of said substrate by a space.

Applicants respectfully submit that Nishibayashi fails to teach or suggest each of the steps that are required by that claim. For example, Nishibayashi fails to either teach or suggest "*covering said substrate to be etched with a plate provided with a number of opening portions; and forming fine textures on a surface of said substrate to be etched by applying RF power to said electrode*", as required by amended independent Claim 20.

The present invention provides an advantage by forming fine textures on the surface of the substrate by trapping the residues in the space between the substrate and the plate having the protruding wall. This formation of fine textures is accomplished by applying RF power to the electrode on which the substrate is placed. The textures formed on the surface of the substrate provide an advantage by helping to effectively absorb incident light. (See, *Specification, page 6, lines 15 to 23; page 9, lines 5-6; page 11, lines 3-8*).

Nishibayashi discloses a diamond etching method using oxygen plasma. In the Nishibayashi method and apparatus a metal grid 9 can be used decelerate

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oxygen ions which had passed through the holes of the metal grid 9. Then, the oxygen ions are accelerated to the same kinetic energy by the voltage between the metal grid 9 and the lower electrode 2. The diamond film which is etched by the apparatus is confirmed to have a smooth surface, as in embodiments 1 to 3, without concaves and convexes. (See, Nishibayashi, Figure 5; column, 2, line 49; column 7, lines 16-22)

By disclosing a method and apparatus that etches a diamond to have a smooth surface without concaves and convexes, Nishibayashi cannot be said to teach, disclose or suggest the step of "*forming fine textures on a surface of said substrate to be etched by applying RF power to said electrode*", as required by amended independent Claim 20.

Thus, Nishibayashi fails to teach or suggest each and every step of amended independent Claim 20, and as such, amended independent Claim 20 is patentable over the cited reference for at least the reasons stated above.

Withdrawal of the above rejections and allowance of Claim 20 is respectfully requested.

Claims 13 and 21 depend from amended independent Claims 13 and 20 and include each of the features and limitations thereof. Thus, the dependent claims are patentable over the cited references for at least the reasons stated above with regard to amended independent claims 13 and 21. Withdrawal of the above rejections and allowance of dependent claims 13 and 21 is respectfully requested.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los

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Angeles, California telephone number 310-785-4755 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,

HOGAN & HARTSON L.L.P.

Date: September 27, 2006

By: _____


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